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IS 14970 (2001): Leather - Lastometer Grain Crack Test - Methods of Test [CHD 17: Leather, Tanning Materials and Allied Products]

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भारतीय मानक

चमड़ा — लास्टोमीटर ग्रेन दरार — परीक्षण पद्धति

Indian Standard

LEATHER — LASTOMETER GRAIN CRACK TEST — METHODS OF TEST

ICS 59.140.30

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 2001

Price Group 2

Leather Sectional Committee, CHD 17

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Leather Sectional Committee had been approved by the Chemical Division Council.

Lastometer grain crack test is one of the universal tests commonly used in order to determine the stretchability of the leather. The test is carried out to determine how much leather can be stretched simultaneously in two directions (distended) without being damaged. This method simulates conditions experienced during the lasting operation in footwear manufacture.

This Indian Standard is technically equivalent to ISO 3379 : 1976 Leather — Determination of distension and strength of grain — Ball burst test. International Organization for Standardization.

In the formulation of this standard assistance has been derived from:

BS 3144 : 1968 Sampling and physical testing of leather. British Standards Institution.

The composition of the committee responsible for formulating this standard is given in Annex A.

In reporting the results of a test and analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

LEATHER — LASTOMETER GRAIN CRACK TEST — METHODS OF TEST

1 SCOPE

1.1 This standard describes the Lastometer grain crack test in leather for the determination of distension of leather.

1.2 The method is mainly applicable to leather upper materials (excluding patent leather).

2 REFERENCES

IS 5868 : 1983 'Methods of sampling for leather' contains provision which through reference in this text, constitutes provision of this Indian Standard. At the time of publication, the edition indicated was valid. IS 5868 is subject to revision, and parties to agreements based on this Indian Standard are encouraged to investigate the possibility of applying the most recent edition of IS 5868.

3 OUTLINE OF THE METHOD

A circular specimen of the material is clamped round its edge and is gradually distended by forcing a small metal ball attached to a plunger through the specimen. At a certain distension, measured in terms of distance travelled by the plunger, either cracks appear in the surface of the material or a lower layer of the material sustains physical damage; this distension is recorded as the first damage point. At a higher distension the material usually bursts and this distension can also be recorded. Throughout the test the travel of and force on the plunger may be monitored so that, if required, a plot of force against distension can be produced.

4 APPARATUS

4.1 Lastometer (*see* Fig. 1) consisting of the following parts.

4.1.1 A means of clamping the test specimen round its edge leaving a central circular free area of diameter 25.00 ± 0.05 mm.

NOTE — The design of the clamping system of the machine should ensure that the specimen does not slip during the test and should neither stretch nor compress the central area of the test specimen as it is clamped.

4.1.2 A movable plunger with a 6.25 ± 0.05 mm diameter spherical ball at the end.

4.1.3 A means of moving the plunger relative to the test specimen clamp at a speed of 0.20 ± 0.05 mm/s.

4.1.4 A device to monitor the distension (travel of the plunger from zero) having a least count of 0.1 mm.

4.2 A device to monitor the force on the plunger within the range 0-800 N to an accuracy of ± 10N.

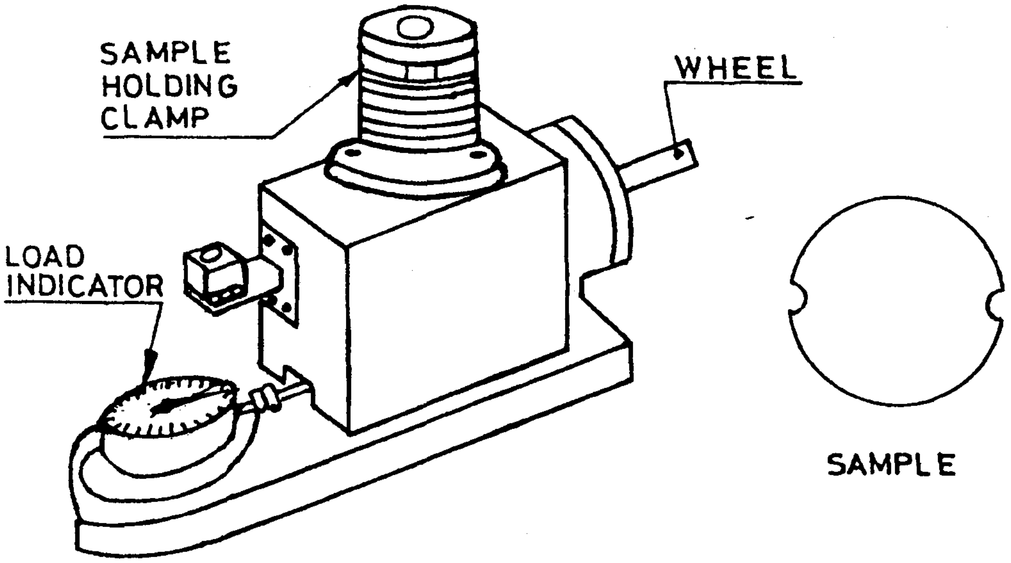

FIG. 1 TYPICAL LASTOMETER

5 PREPARATION OF TEST SPECIMENS

Test specimens shall be prepared to meet the requirements of **4.1.1**. Test specimens should be of a sufficient size to allow them to be clamped firmly on the test machine, so that they do not slip during the test. Normally a specimen of 44.5 mm diameter will suffice. For some lastometers two semicircular cut-outs around 3-4 mm radius at opposite ends of a diameter may also be required to hold the specimen on the two locating pins, (*see* Fig. 2).

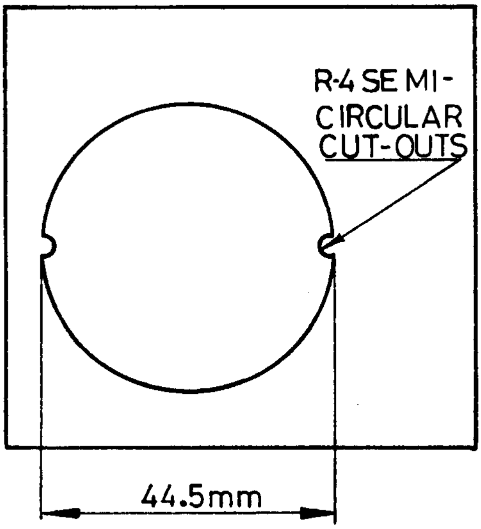

FIG. 2 TYPICAL DIMENSIONS OF TEST SPECIMEN

6 PROCEDURE

6.1 Cut three test specimens, in accordance with the method prescribed in IS 5868.

6.2 Condition the test specimens at 27 ± 2°C and relative humidity of 65 ± 2 percent for at least 48 h.

6.3 Ensure the test machine is reset with the central plunger retracted to zero or minimum distension.

6.4 Tightly clamp the specimen, grain side up into the test machine. For thick specimens a very high clamping force will be necessary whereas with thin specimens care is required to avoid cutting into the specimen.

6.5 Start the test by forcing the plunger into the specimen at a rate of 0.20 ± 0.05 mm/s.

6.6 As the plunger stretches the specimen, record the point of first damage which usually occurs in the finish or the surface of the grain. Continually observe the surface of the specimen, at the centre where the maximum distension takes place. At the first sign of surface cracking, record the force on the plunger and the distension of the specimen. However, if the grain is still intact, continue until grain crack occurs and record the distension and force at this point

6.7 Retract the plunger and remove the test specimen.

NOTE — If removal of the specimen is difficult because the plunger has pierced it, the plunger can be lifted out of the machine together with the specimen. The plunger can then be manually pulled out of the specimen and replaced in the lastometer.

6.8 Inspect the marks on the top of the specimen left by the clamps. If there are signs of the slippage occurring during the test evident by a blurring of the inner clamping rings, or of tearing of the clamped edges: reject the results and repeat the procedure with a new specimen.

7 CALCULATIONS

Calculate the average results for the three specimens, distension to the nearest 0.1 mm, and load to the nearest 10 N.

8 TEST REPORT

The test report shall include the following:

a) Reference to this test method;
b) A description of the specimen that was tested;
c) The average of the three results for distension and force at:
    1) First damage point (*see* **6.6**);
    2) Grain crack (for leathers) if this does not occur at the first damage point; and
d) Any deviation from this test method.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Leather Sectional Committee, CHD 17

Organization	*Representative(s)*
Central Leather Research Institute, Chennai	Dr T. Ramasami
All India Skins and Hides Tanners and Merchants' Association, Chennai	Shri M .Srinivas Shri N. M. Zachariah (*Alternate*)
All India Small Scale Tanners and Exporters, Chennai	Shri G. M. Sharif
Bata India Ltd, Kolkata	Shri P. K.Ghosh Shri N. K. Mazumdar (*Alternate*)
Council for Leather Exports, Chennai	Shri Adisheshiyar
Department of Education, Government of West Bengal, Kolkata	Shri S. K. Basu
Development Commissioner, Small Scale Industries, New Delhi	Shri S. K.Basu
Directorate General of Supplies and Disposal, New Delhi	Shri A. K. Satwah Shri P. Jayakumaran (*Alternate*)
Directorate of Marketing and Inspection (Ministry of Agriculture), Faridabad	Shri O. P. Behari Dr N. R. Mukhopadhyay (*Alternate*)
Directorate General Quality Assurance (Ministry of Defence), Kanpur	Shri G. Gupta Shri G. C. Kanaujiya (*Alternate*)
Footwear Design & Development Institute, Noida	Shri V. B. Parvitikar
Indian Finished Leather Manufacturers and Exporters Association, Chennai	Shri Shafeeque Ahmed Shri V. P. Naimur Rahman (*Alternate*)
Indian Leather Technologist's Association, Kolkata	Shri S. K. Bhadra
Khadi and Village Industries Commission, Mumbai	Shri Y. N. Sharma
Leather Research and Testing Laboratory, Directorate of Industries, Kanpur	Shri A. R. Swaminathan Shri V. P. Bajpai (*Alternate*)
Ministry of Defence (R & D), Kanpur	Shri Anil Agarwal Shri M. K. Awasthi (*Alternate*)
National Institute of Fashion Technology, New Delhi	Representative
Ordinance Factory Board (Ministry of Defence), Kolkata	Shri Ajay Shankar Shri Sanjeev Gupta (*Alternate*)
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The Leatherware, Bangalore	Shri S. Raja
BIS Director General	Shri Lajinder Singh Director & Head (Chem) [Representing Director General (*Ex-officio Member*)]

Member-Secretary
Shri P. Mukhopadhyay
Director (Chem), BIS

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BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
Telephones : 323 01 31, 323 33 75, 323 94 02

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :		Telephone
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110 002	323 76 17 323 38 41
Eastern	: 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700 054	337 84 99, 337 85 61 337 86 26, 337 91 20
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